

Fellow: Brian D. Strahm

OECD Theme: Managing Natural Capital for the Future

Project Title: Stable isotopes to predict forest nitrogen dynamics across New Zealand

Host Institution: Scion, the New Zealand Forest Research Institute

Host Collaborator: Dr. Peter Clinton

Dates of Internship: 01 Mar 2017 to 30 Aug 2017

Consent to my report being posted on the Co-operative Research Programme's website: Yes

1. What were the objectives of the research project? Why is the research project important?

The forestry sector in New Zealand has set the ambitious goal of doubling productivity by 2022. An important component of achieving this goal is increased forest nitrogen fertilization. Concerns about nitrogen fertilization include economic inefficiencies associated with low confidence in predicting growth response of individual stands, and environmental concerns of the negative impact of leached nitrogen on water quality. This project proposes to use nitrogen stable isotope analysis to predict forest stands that retain and respond to added nitrogen. This work is based on similar studies across managed forest ecosystems in the United States and will leverage existing New Zealand-wide trials with the ultimate goal of providing the information needed to improve existing decision support frameworks and inform ongoing policy discussions regarding land use change and intensification impacts on water quality.

2. Were the objectives of the fellowship achieved?

The objectives of this research are clearly on the way to being achieved. New research trials were initiated during my time in New Zealand, which will continue to be the basis of a productive collaboration for the next few years. In addition, samples from historic trials are presently being shipped back to my lab in the US for stable isotope analysis.

3. What were the major achievements of the fellowship? (up to three)

- Improved networking, communication, and collaboration between home institution and host agency.
- Development and application of new techniques.
- Initiation of new suite of field trials.

4. Will there be any follow-up work?

Follow work will occur in two primary ways:

1. New field trials and sample analysis are either planned or underway. This will be the basis of a sustained collaboration for the next few years at the very least.
2. It is also expected that this work result in peer-reviewed publications with authorship spanning across the two collaborating institutions.

5. How might the results of your research project be important for helping develop regional, national or international agro-food, fisheries or forestry policies and, or practices, or be beneficial for society?

As this work is in direct collaboration with Scion, a New Zealand Crown Research Institute that specializes in research, science, and technology development for the national forestry sector, the potential impact for New Zealand as a whole is clear. Further, given the industry desire to increase forest productivity, it is more than likely that they will quickly adopt any new approaches that will help them improve the use of nitrogen fertilizers within environmental limits as the economic and environmental benefits will be obvious; however, the impact also extends existing research across the two largest managed forest systems in the US, thus expanding the potential relevance of the research well beyond New Zealand. If generalized relationships can be observed across these three distinct regions, the outcomes might be broadly applied to global forest systems.

6. How was this research relevant to:

The goal of this proposal is to allow for targeted nutrient management that ensures the economic efficiency and environmental sustainability of forest fertilization across New Zealand. Thus, its focus is sustainable management and intensification at the stand- and landscape-scales to preserve environmental quality (e.g., avoid terrestrial nitrogen saturation and the degradation of adjacent water bodies) while increasing the economic vitality of the forestry sector.

7. Satisfaction

In my opinion, this fellowship was an overwhelming success. Through the OECD fellowship, I was able to develop a new network of collaborators, effectively unifying two disparate networks with similar challenges and interests. In doing so, my career opportunities were bolstered in terms of growing my network, but also, more tangibly, by developing experience in new systems and generating new data streams that will continue to be the basis of future collaboration.

The only challenges were fitting the timing of the OECD fellowship with the timing of my institution's leave opportunity. To the extent that flexibility can be increased, that would help facilitate additional/future collaborations.

8. Advertising the Co-operative Research Programme

I learned about the Co-operative Research Programme through my collaborator, Dr. Peter Clinton. I had not known about the program prior to that. I might suggest increasing visibility by advertising on as many listservs as possible. Perhaps past fellows could help you by being the intermediary and pushing an announcement out to their scientific communities.